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PRUNING SHADE TREES AND REPAIRING THEIR INJURIES

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PRUNING SHADE TREES AND REPAIRING THEIR INJURIES

By Curtis May, Crops Research Division, Agricultural Research Service

Make pruning a part of the maintenance program for your shade and ornamental trees. By inspecting trees regularly and pruning them when needed, you can improve their appearance, guard their health, and make them stronger. And by pruning as soon as the need becomes apparent, you can easily correct defects that would require major tree surgery if allowed to wait.

Emergency pruning may be necessary for the repair of storm damage or other physical injury.

SEASONS FOR PRUNING

Deciduous trees may be pruned at any season. If you wait until the leaves are fully developed, you can visualize the effect that pruning will have on the form of the tree.

Some kinds of trees will "bleed" clear sap from pruning cuts if they are pruned in late winter or in early spring before growth starts. Birch, dogwood, elms, maple, and yellowwood are excessive bleeders. This bleeding is not seriously harmful to the tree, but it usually causes concern on the part of the tree's owner.

Healthy trees usually stop bleeding after leaves develop. If trees

DANGER

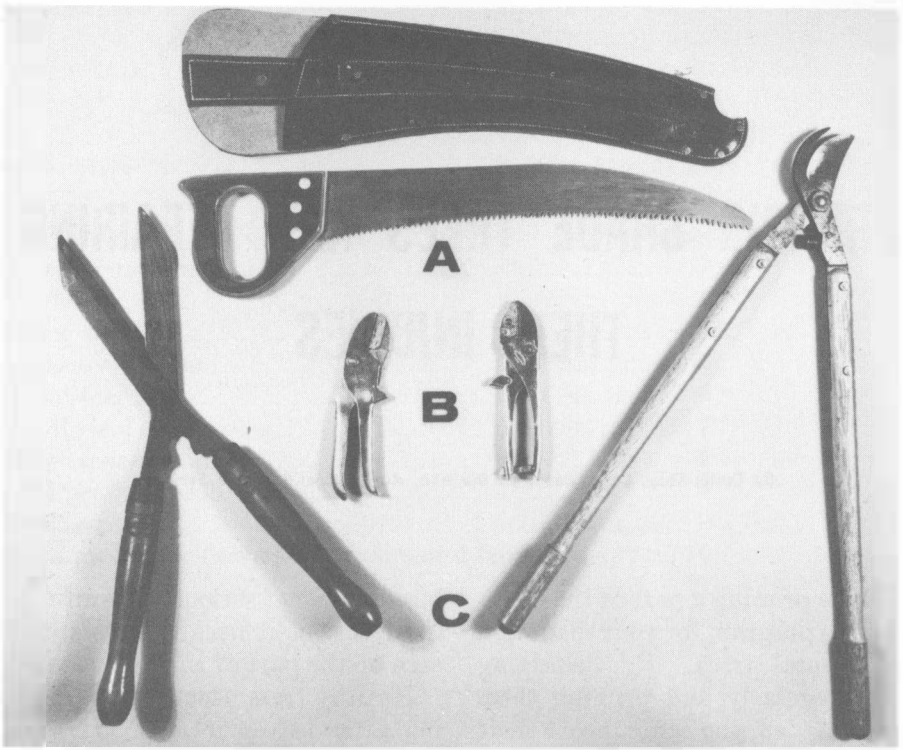
Big trees can be dangerous to prune.

Large limbs are very heavy. If a severed limb gets out of hand, it may cause extensive property damage or may maim or kill workers or bystanders.

A misstep while climbing in a tall tree, momentary loss of balance, or misplaced confidence in the strength of a branch, can cause the pruner to fall to his death.

For greatest safety, engage professional arborists or tree surgeons to do work that requires removal of large limbs or climbing in tall trees.

Select tree workers who are insured against personal injury and property damage.



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Pruning tools: A, Pruning saw and scabbard; B, hand clippers; C, pruning shears.

continue to bleed, they may be infected with a bacterial disease called slime flux.

Pines and other needle-leaf evergreens of this class may be pruned in late winter, in spring before or at the time growth begins, or in midsummer.

Evergreens of the arborvitae class may be pruned or sheared at any time. In the North, however, late-summer shearing may stimulate new growth that is susceptible to freeze injury.

If healthy needle-leaf evergreens are pruned just before growth begins in spring, new foliage grows rapidly, covers pruning cuts, and soon gives the tree a pleasing appearance.

For information on pruning flowering trees, see page 10.

EQUIPMENT

The basic tools for pruning are hand clippers, pruning shears, and a pruning saw. The hand clippers can be used for cutting twigs and small branches. The pruning shears, similar to large scissors, are used for shearing foliage on those trees that tolerate it. The saw is used for removing limbs too large to cut with hand clippers.

Pruning saws have coarser teeth than carpenter saws. They are not as likely as carpenter saws to bind when cutting green wood. And the teeth are designed to cut on the pull stroke; this is an advantage over push-cutting carpenter saws for operators working from a precarious position on a ladder or tree limb.

If you have many trees to prune, a pole pruner and a pole saw may be worth while. With these tools you can reach high parts of the trees while you are standing on the ground.

If you must remove large limbs, especially those forming **V** crotches, you will need a mallet and straight-bladed wood chisel to smooth the cuts.

Keep all cutting tools sharp. To prevent spread of disease and decay organisms, disinfect all tools with denatured alcohol after pruning each tree.

For pruning the tops of tall trees you will need ladders and ropes. Be sure the ladders are sound—free of decay and loose connections. Use manila rope at least one-half inch in diameter. Inspect the rope for decay and abraded or broken strands. Before working in tall trees, however, consider getting professional help.

TREATING WOUNDS

Small pruning cuts on deciduous trees usually heal quickly. Large cuts—over 1 inch in diameter—should be treated to prevent entrance of decay or disease while the wound is healing.

CLASSES OF EVERGREENS

Needle-leaf evergreens can be divided into two general classes by their type of growth. The proper time and methods for pruning these trees depend on which of the classes they belong to.

The pine tree is a good example of the first class of evergreens. Trees in this class bear branches in a pattern; branches radiate from the trunk in whorls, like spokes from a hub. There is a length of bare trunk between the whorls. In addition to the pine, examples of this group are spruce, fir, monkey puzzle tree, umbrella pine, and sequoia.

Arborvitae is a good example of the second class. Trees of this group bear branches haphazardly. Other examples of trees in this class are juniper, hemlock, cypress, false cypress, China-fir, *Cryptomeria*, goldenlarch, incense-cedar, larch, *Podocarpus*, *Torreya*, and yew.

For best results, treat the wound with asphalt varnish containing an antiseptic. The antiseptic prevents spread of harmful organisms that may contaminate the treating material. Asphalt varnish containing antiseptic is available at some garden-supply stores.

If you cannot get a dressing containing antiseptic, preferably use ordinary asphalt varnish. But before applying plain asphalt varnish, swab the wound with alcohol or coat it with shellac.

Apply the dressing as soon as the wound is dry. Most pruning

wounds can be painted as soon as they are made. If the wound is wet or bleeding, however, asphalt varnish will not adhere; let the wound dry before applying the dressing.

Keep an unbroken film of dressing over pruning wounds. One coat of paint will last 2 or 3 years—long enough for small wounds to heal completely. Larger wounds may need to be recoated with the dressing several times before they heal. Inspect the wounds periodically and apply additional dressing if the coating is cracked or peeling.

Needle-leaf evergreens usually seal small wounds with natural gums and resins. If a resin coating forms over the wound, the wound need not be painted. If no resin forms, treat the wood as described for deciduous trees.

PRUNING TECHNIQUES

Broad-Leaf Trees

Although small branches and twigs are commonly pruned just above an outside bud or at a fork, they may be clipped or sheared without much regard for the position of dormant buds. New growth normally develops on small branches and twigs a short distance below pruning cuts.

Pruning to a fork or bud that is toward the outside of the tree's crown tends to induce growth that broadens the crown. However, the amount of light the tree receives, the direction of the light, and the nature of the tree also affect the direction of new growth. Some trees do not broaden regardless of the way they are pruned.

When removing large branches, be careful not to tear loose the bark below the cut. Stub cutting will prevent this.

Stub-cutting.—To prevent stripping the bark, stub cut all branches that are too large to be supported by hand.

Stub cutting requires three saw cuts. Make the first cut on the lower side of the limb, 1 to 2 feet farther out on the limb than the final cut will be made. Saw upward about half way through the limb, or until the wood pinches the saw blade.

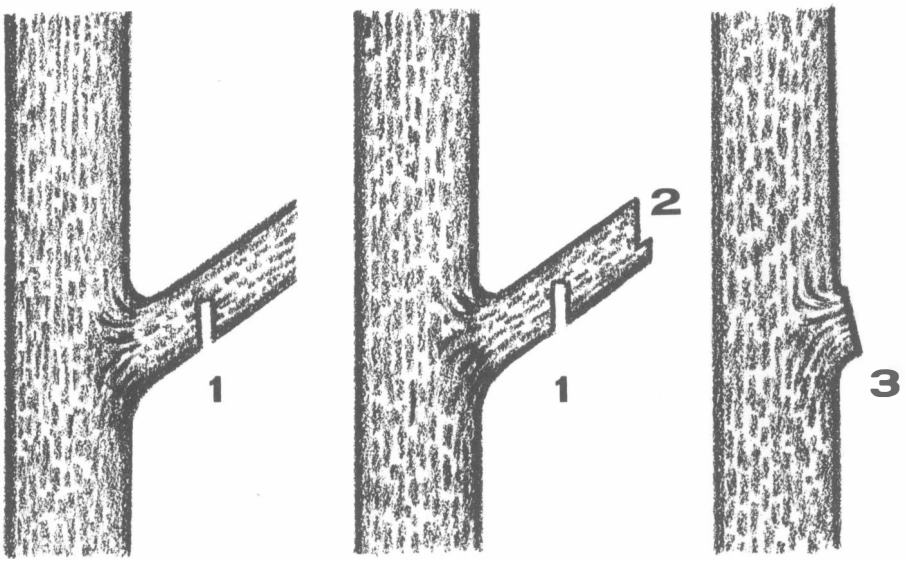
Make the second cut a few inches farther out on the limb. Cut downward from the top until the limb is severed.

Finally, saw off the stub. Leave no bark or wood—or only a very narrow ledge—at the top of the cut. A narrow ledge may be left on the base. Make this cut as smooth as you can; smooth it with the chisel, if necessary.

Short stubs that are not removed usually die. These dead stubs are points through which decay fungi can enter the tree.

V-*crotches.*—To avoid leaving a stub when pruning out one member of a **V** crotch, make the final cut to the point where the two members join solidly. On large limbs or trunks, this point of solid juncture usually is lower than it appears to be.

To find this point of solid juncture, first make a cut from the outside of the branch to the apparent point of juncture. Then, using a chisel, carefully chip away the wood at the crotch until you reach the actual point where the wood joins.



Stub cutting a heavy member to prevent splitting the wood and stripping the bark. Make first cut from below at 1; cut off the limb from above at 2. Then remove the stub with a cut at 3.

When you have found the point of juncture, shape the cut so it slopes downward from this point. Make the angle of the slope no larger than is necessary to permit normal healing—an angle of 30 to 45 degrees is about right. A sharper angle leaves too large a wound. A shallower angle commonly retards healing, presents more opportunity for water to soak into the wood, and encourages growth of decay fungi.

Needle-Leaf Evergreens

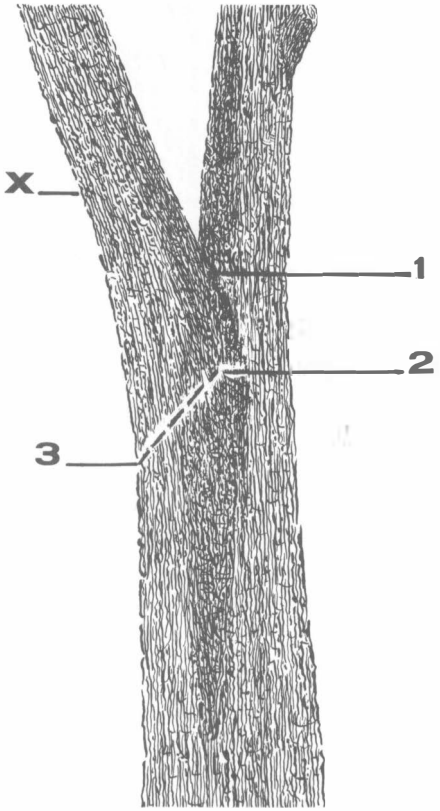
Arborvitae and other needle-leaf evergreens of its class (see p. 5), can be shaped by overall shearing. Evergreens of the pine-tree class do not respond as well to shearing; they usually are shaped by pruning individual parts.

To thicken the crown of trees not tolerating shearing, pinch back the young "candle" growth while it is still soft. This encourages the development of numerous small branches.

Shorten small branches in spring by cutting at a fork; remove only the growth of the previous season. Dormant buds will then soon begin to grow and form new branches.

If drastic pruning is required on pines or similar trees, remove some whole limbs. Do not prune branches to leafless stubs; these seldom develop new foliage.

If the leader is broken or cut from pines, spruces, or other trees of that class, the tree often fails to develop a new central stem. Height growth is retarded. This results in the tree having a low, broad shape that is not typical of the species.

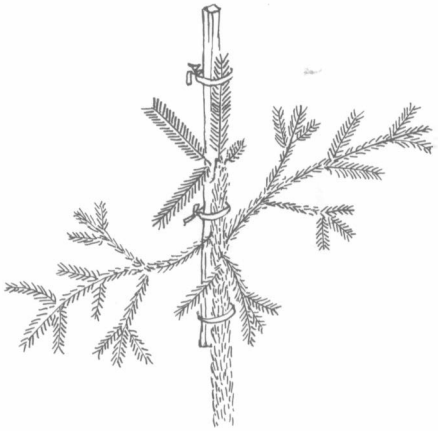


Cutting a V crotch. Stub cut the large member at X. The apparent juncture of the branches is at 1; the actual point of union is at 2. A cut from 3 to 2 gives the best surface for healing.

Sometimes you can help the tree develop a new leader and avoid this unusual shape.

First, select a pliable branch in the uppermost whorl of growth. Bend this branch upward. Hold it in a vertical position by tying it to a splint that is attached to the tree's main trunk.

After a year or two the vertical branch begins to grow as a leader; new branches grow from it in a whorl typical of these trees. When this branch formation is apparent, the stake or pole can be removed from the tree.



Young branch of an evergreen held upright by a splint to form a new leader.

MAINTENANCE PRUNING

In your program of scheduled pruning, try to eliminate undesirable branches or shoots while they are young. Drastic, difficult, or expensive pruning may be avoided by early corrective pruning.

Here is a list of things to look for and prune:

- Dead, dying, or unsightly parts of trees.
- Sprouts growing at or near the base of the tree trunk.
- Branches that grow toward the center of the tree.
- Crossed branches. If branches cross and rub together, disease and decay fungi can enter the tree through the abraded parts.
- V crotches. If it is possible to do so without ruining the appearance of the tree, remove one of the

members forming a V crotch. V crotches split easily; their removal helps to prevent storm damage to the tree.

- Multiple leaders. If several leaders develop on a tree that normally has only a single stem and you wish the tree to develop its typical shape, cut out all but one leader. This restores dominance to the remaining stem.
- "Nuisance" growth. Cut out branches that are likely to interfere with electric or telephone wires. Remove branches that shade street lights or block the view in streets so as to constitute a traffic hazard. Prune out branches that shut off breezes. Cut off lower limbs that shade the lawn excessively.

Unless all of your trees are small, you probably will need help from professional tree surgeons for the first year of your pruning program.

SPECIAL PRUNING PROBLEMS

New Trees

At the time of transplanting, remove all branches that cross or rub other branches. Smooth the ragged ends of any broken parts.

If the tree has been dug carefully and handled properly, no other pruning may be needed.

If the roots have been damaged, however, prune off about one-third of the length of twigs and small branches. By removing part of the top, you compensate for loss of roots.

Do not cut branches on the lower part of the tree at this time. To do so leaves the tree with a tuft of branches on a slender stem. Such a tree may sway in the wind so much that the roots are loosened.

A year or two after planting, the tree may need pruning to improve its form. Begin at this time to choose the tree's permanent scaffold branches.

When possible, choose wide-angled crotches rather than V crotches. Branches used as permanent scaffold branches should be spaced some distance apart on the trunk; when several branches grow from the same level on the trunk, their crotches are weak and will break sooner or later.

From this time on, include the new trees in your maintenance-pruning program.

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Typical evergreen of the class having a whorled type of growth.

Trees Grown for Flowers and Ornamental Fruit

If trees set flowerbuds one summer and produce flowers from these the following year, prune them soon after the flowers bloom. If you wait until fall or winter to prune, you will cut off next year's flowers. Examples of trees in this class are eastern dogwood, flowering crabapple, goldrain tree, flowering cherry, and spring-flowering magnolias.

If the tree produces flowers on the current season's growth (such as crape myrtle), prune it in late winter or early spring. Pruning at this time encourages new growth early in the growing season.

Here are some pointers to follow in pruning specific trees:

Arbutus (*Pacific Madrone*).—Arbutus may be cut back in the spring when growth starts. Ordinarily, it requires very little pruning.

Holly.—Prune holly in early spring or late autumn just before Christmas. If you do not care about its berry production, you also can prune holly in summer. But heavy pruning in spring or summer may reduce the current season's production of berries. Extensive pruning after the berries have ripened also will reduce the next year's crop. Cutting some branches for Christmas decorations, however, will tend to promote compact growth of the tree.

Rhododendron.—If pruning is done only to shape a plant, prune a little at a time several times throughout the summer.

Remove dead branches and branches with wilted leaves promptly—whenever they occur. Do all other pruning after flowers fade.

Pinch off the flowers when they fade. Carefully remove at its base the soft spur holding the flowers. Removing this spur encourages growth of the leaf buds around it. Flower buds for the next year's display form on new growth from these leaf buds.

In pruning branches to give shape to the plant, cut just as close as possible above a node or fork. Dormant buds are formed at the nodes. Do not leave a long bare stub.

If plants have long stems and a straggling appearance, the stems can be cut back to 1 to 2 feet in late winter before growth starts. Do not cut stems any shorter than 1 to 2 feet; even with this amount of stem, some bushes will not produce new growth.

To make sure that the plant will bloom well the next year, it is a good idea to prune back no more than one-third of the total number of branches each season.

Most named varieties of rhododendron are grafted; cut off low sprouts on these. Sprouts originating below the graft will not produce the right kind of flowers.

Magnolia.—Pinch off faded flowers to stimulate new growth and thicken the crown. Prune sprout growth that develops below the union on grafted plants. Cutting back southern magnolia usually reduces the next year's flower crop.

Southern magnolia blooms in the summer and forms new flower buds by late summer.

Palms

Never prune out the terminal bud on a palm tree. If the terminal bud is removed, the whole stem will die.

Multiple-stemmed palms produce new shoots from below the surface of the soil. Plants of this type often can be improved in appearance if the oldest stems are cut out periodically. These old stems can be removed without danger of killing the plant. Cut them off as close to the ground as possible.

Remove all seriously diseased leaves.

Except for renewal pruning of multiple-stemmed plants and removal of diseased leaves, palm trees need be pruned only to prevent their becoming nuisances or hazards.

Dead leaves of most kinds of palms form a skirt around the trunk beneath the crown. These clusters of dead, dry leaves may become a fire hazard. And they often harbor insects and rodents. It is best to remove the leaves on these palms as soon as they discolor and begin to droop.

Some palms shed their leaves. Royal palm is an example of this type. These leaves may be heavy; when they fall they may injure passersby. If trees of this type are growing where falling leaves may be hazardous, remove the dying leaves before they drop.

Coconuts and other large fruits also can be dangerous to persons passing beneath the tree. To prevent formation of fruits on large-fruited palms, remove the flower stalks after they have bloomed.

Some palm trees have spiny trunks. It may be necessary to remove the spines from the lower trunk to prevent injuries.

When removing palm leaves, cut them from the underside to avoid tearing the fibers of the tree's stem.

Old Trees and Groves

Many large old trees are sun-scalded if they are heavily top-pruned or if they were part of a forest and most of their companion trees are cut down; their bark is killed when it suddenly is exposed to full sunlight after growing in the shade. Trees with thin bark are most susceptible—sugar maple, red maple, apple, linden, and beech are examples. Some oaks also are susceptible to sun-scald.

To prevent sun-scald, prune only part of the tree top in any one year. Thin old forests and groves by cutting down the unwanted trees over a period of years rather than all at one time.

Pruning practices for old trees are much the same as those listed under "Maintenance Pruning" (p. 8). But remember, old trees may be hazardous to work in. Consider getting professional help for pruning old trees.

One other pruning practice—pollarding—is sometimes used on old trees. Pollarding is the cutting off of the top of the tree, leaving only the major limbs. These limbs then are expected to produce a new crown.

Pollarding can be recommended only for unusual circumstances. It

is satisfactory on only a few trees. Silver maple, poplars, willows, and London plane withstand pollarding. But even these trees have an unpleasing appearance until they can grow new crowns.

Protect all pollarding wounds with a wound paint, preferably asphalt containing an antiseptic.

REPAIRING INJURIES

Prompt treatment of injured trees can keep them from becoming unsightly or dangerous and may save them from death.

Injuries exposing wood or killing the bark may allow disease and decay organisms to enter the tree. Treat these wounds to protect the tree until the wounds heal.

Bark Injuries

If bark has been crushed or knocked from the trunk, two methods of treatment may be possible.

Method 1 consists of replacing loosened bark and holding it in place until the bark starts to grow again.

Method 2 consists of removing all injured bark, shaping the wound, disinfecting it, then applying antiseptic paint.

Method 1.—If bark is knocked from the trunk in a large piece, it is sometimes possible to get the bark to grow back on the tree.

Nail the bark back in place immediately, before its inner side or the exposed wood has dried.

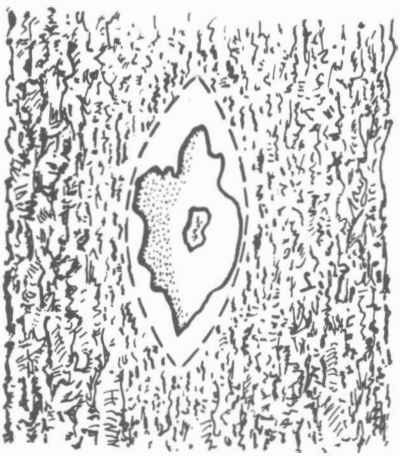
Now place a layer of damp sphagnum moss about 2 inches deep over the wound and cover it with a sheet of polyethylene film (the plastic used in freezer bags). This sphagnum-plastic bandage should cover the entire wound and extend beyond it for a few inches.

Seal the edges of the plastic to the tree with asphalt paint. If necessary, smooth the bark around the wound to make a good seal.

Then, after sealing the edges, bind the bandage to the tree with twine.

The objective of the bandage is to hold in just enough moisture to prevent drying of the inner side of the wound until a natural union is made between the replaced bark and the wood. No water should be allowed to collect inside the bandage. If water does get in, punch a small hole in the bottom of the bandage to let the water drain out.

If the attempt to replace the bark fails, treat the wound area as described under method 2.



Bark injury. The bark around the injury should be trimmed as indicated by the dotted line to promote rapid healing.

Method 2.—Cut away all damaged bark and remove isolated scraps of bark in the wound area. These islands of bark usually die and do not assist in healing.

For fastest healing, shape the edge of the wound as nearly as possible to the elongated ellipse illustrated on page 12. If this ideal shape cannot be attained, try to make a point at the top and bottom of the wound even if you have to enlarge the wound.

Remove all splintered wood and smooth the surface of the exposed wood. Then disinfect the wound and apply antiseptic paint. Large, slowly healing wounds may need additional paint after 2 or 3 years.

Inspect large wounds occasionally to be sure the paint surface is intact. Breaks in the paint film should be repainted. If any decay has developed in the wound, it should be cut away and the wound re-treated.

Lightning Damage

Usually you cannot tell how badly a tree is damaged by lightning for about a year after it is struck. Trees that seemed to be badly damaged may live, while others apparently only mildly injured may die. However, paint exposed wood on lightning-damaged trees. Remove all shattered parts and dangerous hanging limbs.

Split Trunks and Crotches

Split trunks, crotches, limbs, or branches often can be mended by restoring the damaged part to its original position and holding it there permanently.

Split trunk.—First smooth edges of the damaged parts. Disinfect the wound with denatured alcohol or shellac. Then draw the parts together with bolts inserted in holes drilled straight through the separated parts. Finally, cover the crack with antiseptic paint.

Splits caused by freezing sometimes cannot be held with bolts. These splits often heal without treatment but open again in the winter when they freeze.

Split crotches.—These can be drawn together with bolts through them. However, they usually require additional support from lag-threaded screw rods or from cables with toggle bolts.

Installation of lag rods or cables with toggle bolts requires skill. If

POWER LINES

When surveying or repairing tree damage after a windstorm or ice storm, beware of power lines.

Before approaching a damaged tree, inspect the area carefully to be sure that the storm has not also knocked down power lines. If electric wires pass through or near damaged trees, be sure, before touching the tree, that damaged parts are not resting against the wires.

If wires are down or if branches are lying on the wires, notify your electric company or cooperative immediately. Do not try to correct the trouble yourself; the electric company has emergency crews who will remove dangerous branches and repair downed wires.

tree repair requires complicated bracing, cabling or cavity filling, consider hiring a competent arborist to do the work.

Judgment is needed in determining the number of lag rods or cables needed for support and the height above the crotch at which they should be placed.

The tension on cables should hold them firmly without slack during the dormant season. They should be installed from one-half to two-thirds of the distance from the damaged crotch to the upper end of the damaged members, whenever possible. Short cables installed near the crotch often fail because of the severe strains imposed upon them.

Details of other tree-surgery practices may be obtained from textbooks on the subject.

Uprooted Trees

Trees partly or wholly uprooted often may be saved by prompt action.

Cover the exposed roots immediately to keep them from drying until you can make arrangements to restore the tree to position. Use wet burlap, hay, clay mud, plastic sheets, or any other convenient material to retard drying.

Just before you return the tree to its original position, cut away shattered roots and dress the wounds with antiseptic asphalt paint.

If you cannot put the tree back by hand, try block and tackle, winch, drag line, jacks, or even a bulldozer.

Protect bark with padding where pressure is applied.

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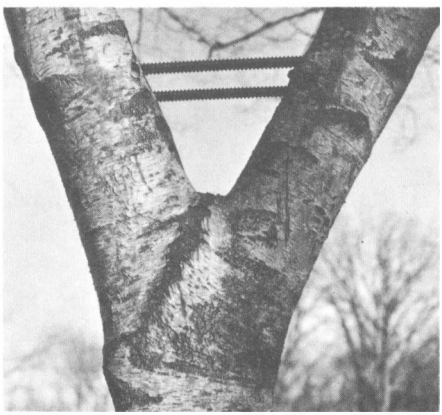
These storm-damaged branches should be removed and the wounds smoothed, shaped, and coated with wound dressing.



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Split crotch repaired by placing threaded rods through both members.

If the tree has been blown over while in foliage, spraying the leaves with an anti-wilting preparation may help the tree recover. If the root system has been partly destroyed, it may be advisable to prune off part of the crown. Water the

tree during droughts until new roots have formed. Fertilize the tree if it is of low vitality.

After the tree is restored to its original position, install guy wires to hold it in place until the root system regenerates. Use at least three guy wires; more may be better.

Place the wires high enough—about two-thirds the way to the top of the tree if the trunk is strong enough at that point to withstand pressures of the wires in strong winds. If wires are placed too low, the leverage of the top may loosen the wires, making them useless as supports. A crotch is a good place to anchor the wires.

Use a short length of rubber hose around each wire to protect bark from injury. Loop the hose-covered wire around the trunk and twist the end of the wire back around the main part of the wire. Do not wrap the loop so tightly that the growth of the bark is restricted.

Fasten the wires securely to sturdy stakes or other solidly anchored objects. If you use three guy wires, choose anchor positions that approximate as closely as possible the corners of an equilateral triangle. Place one anchor where the wire braces the tree against prevailing winds.

Remove wires in 1 or 2 years; do not leave them in place until they start to cut into the bark and thus interfere with growth.

Protect weakened trees from bark and wood-boring insects by applying an insecticide. Use any garden-type insecticide whose container label recommends it for use against these insects. Spray the trunks of small trees and the major branches, limbs, and trunks of larger trees. This may help to save some injured trees, especially those with thin bark.

CAUTION

If insecticides are handled or applied improperly, or if unused parts are disposed of improperly, they may be injurious to humans, domestic animals, desirable plants, and pollinating insects, fish, or other wildlife, and may contaminate water supplies. Use insecticides only when needed and handle them with care. Follow the directions and heed all precautions on the container label.

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Use Pesticides Safely

FOLLOW THE LABEL

U.S. DEPARTMENT OF AGRICULTURE